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ABSTRACT

This paper offers suggestions on how individual faculty can apply Total Quality Management (TQM) practices to their teaching. In particular the paper describes the experiences and lessons learned by two business school faculty members who took to heart the "Galvin Challenge," Bob Galvin's challenge to professors at the Xerox Quality Forum of 1989 to effect major improvement in higher education for greater efficiency and effectiveness. A section on professorial freedom and students as customers argues that faculty need much more data in a timely fashion than they usually get. A discussion of course evaluations concludes that these improve teaching. The next section describes the development and work of a laboratory course, Business 712, at the Chicago Business School (Illinois) in which faculty and students work together using TQM principles to develop new and improve ongoing courses. Specific experiences and suggestions for course improvement and fast feedback (includes some sample questionnaires) are then offered. Responses to criticisms of fast feedback are then considered. It is noted that research coming out of Business 712 has resulted in suggestions for course strategy, curriculum design, and research. A final section offers some personal reflections on the Galvin Challenge. (JB)

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TQM FOR PROFESSORS AND STUDENTS

George R. Bateman and Harry V. Roberts

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1. Total Quality Management (TQM) and Higher Education

We begin with a 21-word definition that, for us, catches the essence of Total Quality Management (TQM):

"Continually serve customers better and more economically, using scientific method and teamwork, and concentrating on removal of all forms of waste."

Total Quality Management has not bypassed universities, colleges, and community colleges. Many colleges are now exploring the potential of TQM, and some have begun to attempt its implementation. In most initial efforts, the major emphasis has been on improvement of administrative rather than academic functioning. Professors are not felt to be receptive to improvement ideas coming from the business world. But three important points need to be noted:

- Administrative improvement is not necessarily a soft target. College administrators are often in much the same position as politically appointed heads of government agencies who have great difficulty when they try to change rigid bureaucracies.

- Myron Tribus has argued that many administrative processes are actually counterproductive for the central academic

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functions; that counterproductive processes should be eliminated, not improved; and that counterproductive processes can be identified reliably only after the academic processes have been improved. ("Do It in the Classroom or Don't Pretend to Do It at All!", National Quality & Education Conference, Colorado Convention Center, Denver, Colorado, November 9, 1993.)

- On the other hand, college professors have a strong self-interest in improving teaching, and individual professors often have substantial freedom to act on their own.

We therefore suggest high priority for the application of TQM to the improvement of teaching, and we report on some interesting explorations in that direction.

The Galvin Challenge

Our theme comes from Bob Galvin's challenge to professors at the Xerox Quality Forum of 1989, where the attending deans and professors in business schools agreed on the desirability of including TQM courses in MBA programs. But they saw formidable obstacles: MBA curricula were already packed full, they said. Several other new areas were contending for inclusion: international business, business ethics, environment, diversity, regulation, leadership, innovation, creativity, etc. How could they possibly make room for TQM? What would they have to give up?

Bob Galvin, then CEO of Motorola, replied as follows:

> What do you give up? I wonder if it's fair to ask of you, as we in industry have been obliged to ask of ourselves, "How efficient are you? Why can't you teach 50 percent more in a year than you're now teaching?"
>
> Not one percent. It's this big step-function phenomenon. Why can't you in two or three years change your curricula? Decide that you're going to add all these things in two or three years, and do it. That is what we in industry are having to do to serve our customers.
>
> How do you do it? I don't know. That's not my business. But I do know that for our business, we have to accept the challenge. You have to have the mindset that it can be accomplished. Once you start looking for the solution, you'll come close. Maybe you'll only improve it 40 percent instead of 50, but you can put out a lot more information!

Galvin's challenge was unconventional in that he suggested the possibility of major improvement, not minor refinement.

Another way to express the challenge would be in terms of reducing educational cycle time. The following example from the Training Within Industry (TWI) of World War II suggests that dramatic reductions in cycle time may sometimes be possible.

> An early success of the TWI service was its role in eliminating the nation's critical shortage of skilled lens grinders. In late 1940, a government search for 350 such specialists for use in bombsights, periscopes, and other optical equipment, had turned up no qualified people. Unfortunately, under the existing system it took five years to train a master lens grinder. TWI was asked to study the problem. It was found that a master lens grinder was expected to be able to perform twenty jobs, of which only a few were highly skilled. The unskilled jobs could be assigned to less skilled workers. When these tasks were reassigned according to TWI recommendations, the problem eased tremendously. What is more, TWI specialists, using the methods from the JIT [Job Instruction Training] course, redesigned the program for new lens grinders and managed to reduce the training time from five years down to two months. (Alan Robinson, **Continuous Improvement In Operations: A Systematic Approach to Waste Reduction**, Productivity Press, 1991, 14-15.)

The example of the lens grinders suggests that the potential for improvement of education can be much greater than at first appears possible. But how could a 97 percent reduction of training time -- five years to two months -- have been possible?

We do not know the details, but TQM suggests that one key is waste reduction. All processes in all organizations entail waste, often substantial and seldom obvious. TQM has especially emphasized waste due to poor quality, which leads to defects that require rework. Another important form of waste is the waste of doing things that are unnecessary or counterproductive, even though they do not result in defects. These forms of waste are potentially present in teaching. Students may misunderstand and have to be corrected, possibly repeatedly. Teachers may emphasize topics and concepts that do not contribute to the objectives of their courses.

How to Respond to Galvin's Challenge?

In 1989 when we heard it, we were inspired by Galvin's challenge, but we had very little idea as to how we could respond to it. Like many others, we could see easily how to apply TQM to other people's problems, but our own work seemed different. In this paper, we shall explain a partial but satisfying response, a response that is occurring very widely and seemingly spontaneously in many sectors of higher education today.

2. Professorial Freedom and Students as Customers

To develop an approach to Galvin's challenge, we begin by noting:

- Professors are relatively free to change the way they teach.
- Professors want to be good teachers, and there are ways -- even for college presidents, deans, and department heads -- to encourage good teaching.
- One key TQM idea is customer satisfaction. We shall contend that in some important respects, students are customers.
- The TQM movement has already led many professors to begin to think of students as customers.

The view of students as customers is not universal; it is often resisted, even resented, by professors. It can be construed much too narrowly. Students are not customers in the sense of customers of, say, Honda or Chrysler, where the customer must always be assumed to be right. Nor are students the only customers of professors. And students play other roles than that of customer: it is sometimes useful to regard them as co-producers.

But the idea of students as customers is a healthy offset to the paternalistic assumptions that many professors have traditionally made, namely that the professors know what is best for students, and that students cannot well judge their own long term self-interest and have to be given lots of medicine that they don't want to take. This professorial paternalism can lead to complacency, stagnation, failure to check how much is really being learned and retained, and the working hypothesis that students' needs coincide with professors' interests. Worst, it can lead to fatalistic acceptance of poor student performance.

By contrast, the idea of students as customer encourages professors to take responsibility for success of teaching, and therefore to become interested in methods of improving teaching. We can testify from personal experience that teaching looks very different when one thinks of students as customers. Professors begin to try to figure out **why** students perform poorly or challenge the relevance of the subject matter for their needs. They begin to think about getting relevant data. **Our thesis is that professors need much more data than they usually get, and they need it in a more timely fashion.**

3. The Role of Course Evaluations in Improving Teaching

We begin with the topic of performance appraisal, which is heretical to many TQM gurus. We believe that if a customer focus is to be achieved, some information about customer satisfaction is essential. Since the late 1960's, the Graduate School of Business, University of Chicago, where the authors teach, has used student course evaluation questionnaires in all courses, **with systematic public reporting of results.** The Kellogg Management School at Northwestern University also makes use of public course evaluations and regards them as essential for maintenance and enhancement of high teaching standards.

Just as grading often make students uncomfortable, course evaluations often make professors uncomfortable. Even the best teachers occasionally stumble, and consistently poor teachers are known to all, students and faculty. But, in spite of minor technical reservations, the Chicago faculty generally believe that the course evaluations provide the best generally available information we have about teaching effectiveness. Faculty members do not believe that the evaluations are mere popularity ratings, or that they can be manipulated to achieve high ratings by debasing content and emphasizing entertainment and showmanship.

Further, although we cannot prove it, we believe that teaching at Chicago, is much better than it would have been in the absence of public course evaluations because evaluations encourage the faculty to treat students **as if** they are customers, whether or not the word "customer" is used. In promotion decisions, a summary of course evaluations always is included in reports and discussions of the Appointments Committee, and this encourages good teaching. Both at Chicago and Northwestern, the course evaluations are taken into serious account by the deans in programs to improve teaching.

4. The Teaching Laboratory at the Chicago Business School

Unfortunately, course evaluations are not very helpful in suggesting **specific** things to do in order to improve. They are available only after the course has ended. They use general-purpose questions that apply to all courses; by their nature cannot include course-specific questions. Their numerically-scaled questions tell almost nothing about what worked and what didn't. Some information can be gleaned from tabulation of free response questions to see which themes occurred most frequently, but these tell mainly about pervasive problems rather than specific difficulties.

There have been many attempts at many colleges extending over many years to employ simple feedback questionnaires,

typically informal but focused on the specific class, at the end of class sessions. At Chicago, two developments led us to systematic experimentation in the use of feedback questionnaires and other TQM methodology, and these developments have helped us to begin responding to Galvin's challenge.

- In the fall of 1990, Ian Hau was teaching a large undergraduate statistics course at the University of Wisconsin at Madison. From the students in his class, Hau formed a small quality improvement team to help him improve the course while he was teaching it. (We did not know it at the time, but similar use of student teams was being made at Samford University. (See Kathryn H. Baugher, "Applications of Quality Improvement for the Classroom: Using the LEARN Process for Assessment", National Quality and Education Conference, Denver, Colorado, November 8, 1993.)

- In March, 1991, Andrew Appel, a Chicago MBA student suggested that we use the Chicago "laboratory course" format to help Chicago faculty members to apply ideas and tools of TQM to improvement of their teaching, curriculum development, and research. The idea of a "laboratory course" was originated by Deputy Dean Harry Davis about 15 years ago. In its original format, it was a "New Product Laboratory" in which teams of students work with client companies to develop and implement ideas for new products. The students are coached by faculty and by executives from client companies. The laboratory format has been extended to other kinds of applications, such as implementation of TQM.

Thus was born: **Business 712, The Laboratory to Achieve Organizational Excellence: Improvement of Teaching, Curriculum, and Research** ("Teaching Lab", for short). In the Teaching Lab, the clients are usually faculty members, and most student activity during the first year (1991-1992) was focussed on helping these clients. For example:

- Eleven faculty members worked with lab course students or student teams on the improvement of ongoing courses.

- A team of five students worked with the Behavioral Science Group as a unit on the design of a new required course in behavioral science.

- Two students worked with marketing faculty on curriculum issues in introductory marketing courses.

- A student worked with a faculty member in development of a course on high- tech marketing.

- One student in the lab benchmarked the performance of two of the school's most outstanding case teachers.

These efforts were generally very successful. With respect to ongoing courses, the students developed feedback mechanisms that tell the instructor continually and quickly what is and what is **not** working -- both in class and in the readings -- so that, when necessary, appropriate adjustments can be made, usually very quickly. Various tools were used, including focus groups, videotaping, and broader surveys, but the key tool turned out to be a simple fast-feedback questionnaire, used at all or almost all the class sessions. The feedback questionnaire evolved from lengthy to streamlined, and, as we shall explain later, the process was simplified to the point that faculty members could do it themselves, and many are now doing so. They design simple questionnaires of their own (often confined to one side of one page), administered and interpreted by the professors themselves. The use of fast feedback has become widespread, though far from universal.

Once it became apparent that professors could apply the techniques themselves, students in the second year of the Lab turned to broader issues of curriculum development (e.g., developing a proposal for entrepreneurship as a new area in the curriculum), management education (e.g., benchmarking business efforts in general management training), and administrative facilitation of education (e.g., the use of information technology in MBA education). In the third year, the emphasis was been enlarged to broader issues of management education.

Our focus in the balance of this paper will be what was learned in the first year in development of the fast-feedback questionnaire. During this development we reached several conclusions and promising hypotheses about ways of improving teaching.

- It is essential for students in the class to be sold on the feedback questionnaire. The most important thing is to emphasize at the start that responses will benefit the current class, not just future classes.

- Use of feedback questionnaires can be damaging to the professor's ego, because there are sometimes very negative, even hostile, student reactions, even when a course is going well overall. However, it is extremely helpful to learn about problems while something can be done to address them, rather than to encounter them in full force on the course evaluation questionnaire at the end of the course.

- Ordinarily, instructors must rely on subjective impressions as to what works and what doesn't work. Experiences in the Lab suggest that these impressions are often untrustworthy,

and that they tell almost nothing about variations in reactions by individual students or subgroups of students.

- Often student feedback suggested problems that were not obvious to the professor. For example:
  - In almost every class, there were problems with hearing or understanding the professor, reading the writing on the board, or seeing the visuals.
  - Almost always, students wanted more examples and applications to illustrate abstract concepts.
  - Students were impatient with fellow students who try to dominate class discussion.
  - It was very hard for the professor to judge whether the pace of the class is too fast or too slow for most students, and casual student comments were not a reliable guide.
- The feedback questionnaires can probe into deeper problems, such as understanding of basic ideas, student motivation to put effort into course preparation, or reactions to outside readings. We found, for example, that most students tended to skip readings that could have no impact on the course grade.
- Probing into these deeper problems, however, requires intense involvement by the professor in the feedback process: **the professor must provide reverse feedback.** This can be oral or written, or both. It can take the form of modifications of the course, answers to specific questions, elaboration of obscure points, clarification of the grading system, fuller comments on student papers or cases, additional references, or bringing in outside speakers.
- The process of feedback and reverse feedback tends to draw students and professors more closely together in the improvement of the learning experience. Written reverse feedback from professor to student can literally open a second channel of communication; for example, the professor can provide explanations of points singled out by the fast-feedback questionnaires, even answer specific questions asked on the questionnaires by the students. Reverse feedback can mean substantial time and effort by the professor, but the payback in avoidance of rework is large for students and professors alike. Recall, from the discussion of Galvin's challenge, that rework limits what can be covered in a course.

- When we first started to give written reverse feedback to student feedback, we were not sure whether it would be appreciated or even read. From a question on a later fast-feedback questionnaire, however, we learned that it was both read and appreciated.

- To emphasize the essential role of reverse feedback, we have begun to use the term "Two-Way Fast Feedback" for the combination of fast feedback questionnaires for students and fast written response from the professor.

- More on reverse feedback: students want professors to provide feedback, preferably fast, not only on the feedback questionnaires but on all work that they hand in. Students are not happy, say, with a grade on a case or other written assignment that is unaccompanied by comments. On the other hand there is much to be gained by use of technology to speed up feedback on student work. For example, if students send project progress reports by Fax, so that these reports come in a steady stream rather than a surge, it is possible to give very fast turnaround by return Fax. The authors have found that this is entirely practicable and makes project supervision much easier.

- Groundrules for courses should be made explicit: students should understand what is expected of them and what the instructor expects to provide them. It may even be desirable to discuss the groundrules, and possibly to modify them, with the aim of a mutual understanding that is sometimes called a course "contract".

- Instructors should devote some time to marketing of their courses, including the outside readings, both in advance and during the course itself.

- Major improvements can be gained by helping students to make better use of study time. The fast-feedback questionnaires can obtain information on how the students are actually using their study time. This is a first step for the professor to provide guidance in how to improve study effort.

- Another useful TQM aid to students may be the Personal Quality Checklist, developed by Bernie Sergesketter of AT&T. This is a simple application of TQM to personal work processes, which turns out to be adaptable to student work processes. (See Harry V. Roberts and Bernard F. Sergesketter, **Quality Is Personal: a Foundation for Total Quality Management**, Free Press, 1993, or Harry V. Roberts, "Using Personal Checklists to Facilitate TQM", **Quality Progress**, June, 1993, 51-56.)

- Examinations and grades play a major role, not always positive, in student responses to courses. Many students seem to lack Deming's "constancy of purpose" in pursuing their long term best interests. Motivation is often extrinsic rather than intrinsic; it is a challenge to professors to create intrinsic motivation.

- There should be some structured instruction even in courses where the faculty are primarily coaches and facilitators, including laboratory courses.

5. **Experiences and Suggestions**

The authors have not only facilitated and coached students who help other faculty, but have also applied some of the lessons learned in the Teaching Lab to their own teaching in statistics and quality management. For example, observing what was being learned from the Lab, they made some immediate changes in their own courses. For example:

- Put a copy of the course syllabus and a short student background questionnaire into student mailfolders before the first class meeting of a term.

- Cut down on and focus the course readings.

    - Provide a clear idea of what each reading is to accomplish, not just a general feeling that it will be interesting for the students or "good for them".

    - Try to "sell" the readings.

- Use short fast-feedback questionnaires ourselves.

All these steps proved to be helpful, but the last one was the most important. We make no claim for novelty, because we know of many uses of feedback questionnaires that predate ours. The experience of the Lab, however, helped us to develop a systematic approach that may be useful to others. We use a formal one-page questionnaire and do so after **every** class meeting. (Our classes are typically three-hour classes that meet once a week.) We ask all students to respond and make a major effort to achieve a near-100 percent response rate, and we analyze the questionnaires and plan appropriate adjustments almost immediately after the class.

There are of course many ways for professors to seek out feedback. The time-honored approach is to evaluate quizzes and homework. An increasingly-common approach at our business school and others is to require real-life projects in which concepts of a course are actually applied. Since the authors teach mainly in

the statistics area, they assign projects that require real-world application of statistical tools. Student progress reports on these projects provide excellent feedback, especially on pervasive misunderstandings of statistical ideas that are somehow acquired before reaching our courses: for example, students often believe that the size of the R-square coefficient is the only important indication of the success of a regression study; that statistical significance means practical importance; that haphazard sampling is the same as random sampling; that numerical computations make graphical analysis unnecessary; and that correlation means causation.

Professors can do other things. They can ask for a showing of hands on student experiences or problems, institute a suggestion system, and administer (often to only a few students) very short questionnaires, such as Mosteller's famous, "What was the muddiest point in this lecture?". But the formal fast-feedback questionnaire goes one step farther: it is systematic, frequent, and focused on learning about specific problems that students may be experiencing.

Feedback Questionnaires

The feedback questionnaires developed in the Lab have varied from class to class, but the questions have generally asked both for scaled responses (five-, seven-, or nine-point scales) and free response comments. Some questions are the same from week to week; others vary according to the structure of individual classes. Questions may refer to such issues as:

- Clarity of lectures, quality of discussion, etc., which can be broken down into specific topics for each class session.
- Presentation skills, such as use of overhead projectors, flip charts, or the blackboard.
- Student preparation outside of class, including how much time is spent on readings, problems, and cases and how helpful each reading, case, or problem is perceived to be.
- Free response comments on what students feel to be the most important ideas, the most unclear or difficult ideas, strengths and weaknesses of the instructor, the quality of discussion, suggestions for improvement, etc.

Because of the constraint to limit questionnaires to a single page, which seems to most students to be reasonable, one cannot ask about everything at every session. Certain specific, high-priority questions tend to suggest themselves by the way the course is developing. A few general questions are almost always useful. Example: "What was the muddiest point in today's class?"

It may be useful to stratify answers according to students' backgrounds. For example, in an elementary statistics course ask:

- Quantitative emphasis (engineering, math, science: yes/no)
- One or more prior courses in statistics: yes/no

Then sort the questionnaires into four groups for tabulation.

Feedback questionnaires have usually been anonymous, which means that comparisons through time for the same individuals are not possible. Lab students have experimented with pseudonyms and code numbers in order to be able to make such comparisons, but this has proven cumbersome. The anonymous questionnaires do permit systematic comparison of changes through time for the class as a whole since response rates are high.

In summarizing fast feedback questionnaires for faculty clients, Lab students initially did fairly elaborate analyses, including generous use of graphics. Simpler ways kept commending themselves. For example, on questions requiring scaled responses, percentages can be typed onto blank questionnaires; graphs may not be needed except for showing changes through time. Comments can be typed out verbatim, or classified into major categories for which numerical counts are given, so that Pareto analysis can be applied to focus on priority concerns.

When the faculty member is doing the whole job, even simpler procedures can suffice: simple tabulations of marginal distributions on scale-response questions and rough listings of free response comments, with written commentary on all questions raised by students.

Do It Yourself

In designing feedback questionnaires, one must take into account both response burden on students and time available to tabulate and analyze the results, which means that the questionnaires should be as clear and short as possible. Each question should be aimed at specific information that may be useful. Not all questions have to be asked at every class session, even though this means loss of a complete time series over the course of a term.

Whether the questionnaires are administered by Lab students, teaching assistants, or the professor, it is essential that students in the class be sold on the process. Typically, students will see benefits quickly as the professor clears up misunderstandings or deals with other problems revealed by the questionnaires.

A Five Minute, Two-Page, Fast-Feedback Questionnaire

The following questionnaire, prepared by Roberts for the first meeting of a course called **Statistics and Quality Management**, fits on two sides of a single sheet of paper. The instructor hand-tabulated each of the scaled responses and entered the resulting counts on a blank copy of the questionnaire, and simply read through the free response comments. In about an hour he concluded that:

- Some students had trouble hearing the instructor, a problem that had never been uncovered by informal processes. (The instructor used a portable microphone in subsequent classes.)
- Students preferred that the classroom be fully lighted when overhead slides are used; the overhead slides need to be printed in larger type.
- Most of the students had actually done the advance reading assignment on TQM and felt that the instructor could have gone faster. (In subsequent sections the TQM material was covered much more rapidly, leaving more time for the more difficult statistical material. Most of the learning of TQM came through two required improvement projects, one personal and one organizational.)
- The students wanted more examples. (The use of examples was accelerated throughout the balance of the course.)

The questionnaire is so designed that the process of actually filling it in -- and anticipation of filling it in -- can be valuable for the student. The wording of the questions focuses on facts about performance and specific ways to improve performance, not on whether the instructor or student is doing well or poorly. It also tries to pinpoint problems with the course projects and to problems outside class that may adversely affect performance. The questionnaire can easily be adapted to other courses. The main idea is to keep it simple.

FAST-FEEDBACK QUESTIONNAIRE FOR BUS. 520-88, CLASS OF WEEK ____, WINTER, 1992

TODAY'S CLASS:

	Little or nothing		A fair amount		A great deal
Overall, how much did you get out of today's class?	1	2	3	4	5

What was the most important thing you learned?

What was the muddiest point?

What single change by the instructor would have most improved this class?

Please comment briefly on the helpfulness of the advance reading assignments for today's class.

YOUR PREPARATION FOR TODAY'S CLASS:

	Little or nothing		A fair amount		A great deal
Overall, how much did you get out of your preparation for today's class?	1	2	3	4	5

What one thing can the instructor do to help you to improve your future class preparations?

What one thing can you do to help improve your future class preparations?

YOUR PROGRESS ON QUALITY IMPROVEMENT PROJECTS:

	Behind schedule		On schedule		Ahead of schedule
On balance, how are you doing on your quality improvement projects?					
Project 1	1	2	3	4	5
Project 2	1	2	3	4	5

What one thing can the instructor do to help you to make better progress on the projects?

What one thing can you do to help you to make better progress on the projects?

GENERAL:

Any other feedback about any aspect of the course, including use of computing or topics that you would like to hear more about?

Are you having problems unrelated to this course that the instructor should be aware of?

By the third class meeting, the questionnaire was down to a single page, and all subsequent questionnaires were held to this length. The questions common to all remaining classes were these:

	Little or nothing		A fair amount		A great deal
Overall, how much did you get out of today's class?	1	2	3	4	5

What was the muddiest point?

Here, as an example, are the questions unique to the fourth class:

	Not yet in action		Hanging in there		Quite confident
How would you assess your ability to handle the computing in this course?	1	2	3	4	5

	Hardly at all		A fair amount		A great deal
Is project 1 helping you to improve your job performance?	1	2	3	4	5

	Not at all		Getting started		Encouraging progress
On balance, how are TQM ideas being applied in your own company?	1	2	3	4	5

Comments on TQM in your own company?

Finally, here is the one page questionnaire used at the final class session, the session at which the course evaluation questionnaire was also administered. The question "How much did you get out of the course" also appears on the course evaluation questionnaire. But this last feedback questionnaire obtains a comparative reaction to all major components of the class. It turned out that the two class projects -- one an individual quality improvement project, the other an organizational quality project -- were the most successful of these components.

FAST-FEEDBACK QUESTIONNAIRE FOR BUS. 520-88, CLASS OF WEEK 11, WINTER, 1992

	Little or nothing		A fair amount		A great deal
Overall, how much did you get out of today's class?	1	2	3	4	5

Comments on today's class?

	Little or nothing		A fair amount		A great deal
Overall, how much did you get out of your reading in **Curing Health Care**?	1	2	3	4	5
Overall, how much did you get out of your reading in Schonberger?	1	2	3	4	5
Overall, how much did you get out of your reading in DAFM?	1	2	3	4	5
Overall, how much did you get out of the packet readings?	1	2	3	4	5
Overall, how much did you get out of project 1?	1	2	3	4	5
Overall, how much did you get out of project 2?	1	2	3	4	5
Overall, how much did you get out of the course?	1	2	3	4	5

Any other feedback about any aspect of the course?

Fast Feedback for Short Courses and Seminars

The authors have also had the opportunity to apply fast-feedback questionnaires at short courses and seminars. In an all-day short course, for example, we have used a fast-feedback questionnaire at the end of the morning session to make adjustments in plans for the afternoon session.

Moreover, we almost always ask questions about audience background, answerable by a show of hands, at the beginning of a presentation, even a short presentation, to **any** new audience. Our experience in the Teaching Lab has convinced us that **detailed information about each specific audience is essential.** Approaches that work spectacularly for one audience can completely fail for another, apparently similar, audience. **Each audience presents a unique challenge.**

6. Criticisms of Fast Feedback

Our experience and that of many others at Chicago and elsewhere suggests the value of the two-way fast-feedback approach, which is an simple application of the TQM principle of "serving customers better". We know of no other reliable and generally available way to tell what is working and what is not.

However, not all faculty members are receptive to the approach. Here are some common criticisms, along with our reactions:

- **Fast-feedback is time consuming.** This is true, but there is at least a partial offset: fast-feedback reduces the time spent in rework, both for faculty and students.

- **After initial enthusiasm, students seem to lose interest.** This has not been our experience. If it happens, we venture the guess that the instructor has neglected reverse feedback. That is why we emphasize **two-way** fast feedback.

- **My course evaluations were poor and did not improve with fast feedback.** Most experience we know of is otherwise, but there are two possibilities:

    - When fast feedback is widely used, student aspirations go up. This is a common customer reaction in all TQM activities. For example, compare this year's personal computers with last year's!

    - The sources of low course evaluations may lie in the instructor's personality, and simple feedback questions may not bring these out. However, our experience in the Lab suggests that careful reading of

responses to free-response questions can reveal them if the instructors are able to face unpleasant reality about themselves. For example, they instructor may project arrogance or lack of interest in students, regardless of their real feelings.

- **Fast feedback lets the students dictate what they are taught, yet they are incompetent to judge.** In our view, this reflects a misunderstanding. Students have only a limited ability to evaluate the importance of subject matter, but they can tell with high reliability if they are confused, bored, or skeptical about the value of the material, and it is essential for instructors to deal with confusion, boredom, or skepticism. One reward is the enhancement of one's general sensitivity to student difficulties.

- **Fast feedback is too late. We need real-time fast feedback in electronic classrooms in which students can signal problems as they arise and instructors can deal with the problems in real time.** We concur in the great potential for even faster feedback that is offered by improved technology. However, the technology is expensive and still not widely available, and we believe that fast feedback on paper will fill in gaps in the information that can be captured in class.

- **"Students in my classes have such diverse backgrounds that I can't possibly meet all their needs. I'm sure I'd get bimodal distributions on all the questions if I tried fast feedback."** Maybe you would, but in all our experience, the distributions have been unimodal, and we haven't had to make heroic tradeoffs in the attempt to cope with student diversity. This illustrates a TQM principle that suggests that overall improvement can avoid the need to make tradeoffs.

7. **How Does the TQM Approach Relate to Research on Teaching Methodology?**

Have we discovered things that we should have known all along? Could we have learned about fast feedback from the research literature in Education? After all, teaching methods have been studied systematically for decades by professionals in Schools of Education. We and some of our students have searched this literature a little, enough to be discouraged. We have formed the impression that the TQM approach of improving specific individual teaching processes offers much that is not captured in any general "principles of pedagogy" emerging from the research literature.

Both "research" and "TQM" rely on the scientific method, but there is an interesting difference in emphasis. Successful research leads to principles of varying generality, but it may not be obvious how to apply these principles to make specific improvements. Successful TQM leads to quick, specific improvements of the things one is doing. General principles are likely to emerge from combination and synthesis of what is learned from individual TQM projects.

After starting our work with the Lab, we learned of educational research that is closely related to what we have been doing: Thomas A. Angelo, Editor, (1991) **Classroom Research: Early Lessons from Success**, Jossey-Bass Inc., San Francisco. (A revised and greatly expanded edition became available in March, 1993.) Angelo (pages 7-8) explains the background thus:

> ... despite fifty years of inquiry into teaching and learning in college, the gap between research and teaching is still a chasm that is rarely bridged. Why has this large body of research, much of it good, had so little effect on the practice of college teaching?
>
> Faculty often accuse educational researchers of failing to address the practical day-to-day needs of classroom teachers. ... Researchers counter that their job is to seek verifiable answers to general questions, not to figure out the specific applications of their findings to particular classrooms. ...
>
> ... the critical questions remain unanswered. How can the strengths of research and teaching be joined to improve learning in the classroom? ...
>
> In 1986, in an effort to narrow this long-standing gap between research and practice, K. Patricia Cross proposed a novel way to engage faculty in the systematic, disciplined study of teaching and learning in their own classrooms. She called this approach **Classroom Research**. ... Cross ... envisions Classroom Research as a way to "reduce the distance between researchers and practitioners to zero ... by encouraging faculty to investigate questions that arise in their own teaching. ... Researcher and teacher are one and the same person, and the research-practice gap disappears".

Essentially Classroom Research involves feedback methodology, typically focused on specific items of difficulty, such as failure of students to focus on the main points the instructor intended to convey. The focus of fast-feedback as described in this paper is broader, encompassing all aspects of the course and designed to unearth problems of any kind that can and should be fixed. In our experience, most problems can be

fixed quickly. Classroom Research can be used to follow up in depth on more pervasive and difficult problems.

8. Beyond Two-Way Fast Feedback

The full scope of the Teaching Lab includes not only Teaching and Curriculum, but Research as well. We have had some experience in the design of individual courses, and in exploring areas of potential relevance to MBA curricula such as entrepreneurship and globalization. Even at the individual course level, however, we have focused more on tactics than strategy, and the Lab has not had an opportunity to address broader questions of curriculum design (as opposed to course design). Nor has it had an opportunity to address application of TQM ideas to research.

However, we can offer a few useful suggestions and speculations:

Course Strategy

The usefulness of feedback tools stems from the fact that students know when they can't see or hear or are confused or unclear about content, and can tell a professor when a particular topic seems irrelevant to their interests. Ideas for basic improvements of course strategy, by contrast, must come largely from the professor. One major source comes from improved understanding **by the professor** of the subject matter and of its connection with other subject matter. For example:

- Which topics are essential, which topics can be left out or deemphasized?
- How can we better exploit what students already know?
- What new topics are needed to keep the course up to date?
- Are there simpler and better frameworks for understanding the subject matter? Can, say, one general idea unify several specific ideas, which can then be seen as special cases of the general idea?
- Can process mapping and flow-charting be effectively used to improve course strategy?

TQM can make contributions to course strategy. For example, TQM's insistence on continual and substantial improvement is essential to combat the tendency towards very slow evolution -- often amounting to stagnation -- of textbooks and courses. TQM encourages widening of horizons beyond minor issues, such as, "Should we teach the median before we teach

the mean?" Moreover, TQM tools such as benchmarking, "concurrent engineering", brainstorming, and focus groups can bring out new opportunities in course strategy, and also in curriculum design, which we consider next.

Curriculum Design

With respect to TQM, curriculum design presents tough challenges that are akin to those encountered in improvement of college administrative processes. Professors have both the self-interest and capability to improve their own courses. With respect to the overall curriculum, however, they often see their interest as that of defending the place of their own courses in the overall curriculum. Faculty curriculum committees tend to be more like congressional committees than problem solving teams.

In short the different areas of faculty specialization are like the departments ("functional silos") within companies that result in appeasing the special departmental interests to the detriment of the overall company interest. TQM offers one broad approach to this problem: formation of cross-functional teams to use TQM tools to understand what needs to be done in the overall interest and to provide support for implementation of recommended changes.

There is at least one encouraging business-school example to suggest that the curriculum committee can be transformed into a cross-functional problem solving team: at the University of Tennessee business school such a team is completely and radically revising the entire MBA program. The first MBA class in the new program graduated in 1993. We know of other efforts along the same lines at Rochester Institute of Technology, Babson Institute, and Fordham University, and have heard references to others.

Research

We can offer a few speculations about TQM and faculty research:

- Improvement of teaching and curriculum may eventually free more time for research, even though the short term effects are likely to mean less free time.

- TQM offers ideas and tools for improvement of processes that apply to research processes. For example, personal quality checklists and other uses of TQM at the personal level can be used to improve research. There is good reason to believe that the amount of unnecessary rework and waste in research is as high as it is for other human activities.

- For an analogy, there is good evidence that systems programmers spend less than 5 percent of their time doing new program development; the rest is fixing bugs and cleaning up existing programs and other activities that are made necessary by earlier quality failings.

- One specific contribution of TQM is to be found in the idea of quick changeovers, which is so useful in just-in-time production in manufacturing. Research is often best done in uninterrupted time blocks, but that doesn't mean that research has to be suspended until such time is available. One outstanding researcher who was temporarily impressed into service as a dean found that he could get a lot of research done "between phone calls".

- TQM offers also ideas for improvement of the administrative support systems that are essential to effective research.

- Insofar as research is a group effort -- as is true in much governmentally sponsored research -- TQM ideas can be helpful. Unnecessary review committees, delays in refereeing for research journals, even delays in printing can be attacked by TQM methods. Techniques of concurrent engineering that have been used successfully in new-product development in industry might be adaptable to large scale research projects.

9. A Personal Post-Script on the Galvin Challenge

The preparation of this paper has given the authors a chance to reflect on what progress we personally have made on the Galvin challenge. Most of our teaching relates to statistics and quality management. One area reinforces the other. Exploiting this potential synergy and drawing on the waste reduction achieved from fast feedback, we believe that we are teaching at least 50 percent more than we were four years ago. Student performance on projects, which is our main measure of success, is substantially better. Course evaluations, reasonably good before, have improved.

But a key test case was posed to one of us during the summer of 1993. The director of our Executive MBA Program had been experimenting with the introduction of new material from business law in two of the eleven weeks dedicated to his own course in Operations and Management Science. The business law material was so well received that he asked us if we would be willing to make available two of the eleven weeks dedicated to Statistics and Quality Management for a further expansion of the law material. Our first impulse was to say, "We're already teaching much more than before in eleven weeks, but going from eleven weeks to nine is simply out of the question. You just don't understand what we're trying to do". Our actual response was, "We're not sure we

can do it, but we think we can and we welcome the chance to try." In planning for this effort, we have already been stimulated to do a number of things to improve a critical process that has never been as satisfactory as we would have liked: encouraging and guiding students in hands-on data analysis on computers. Our fast-feedback revealed that this has been the major weakness of past courses.

On a much broader front, we notice that a number of business schools are now raising the possibility of a one-year MBA program that could do all or most of what is now being done in two years. (See, for example, "Harvard Weighs One-Year Version of M.B.A. Program", **Wall Street Journal**, October 29, 1993.)